

## Research Notes

Program Steering Committee (PSC): Pavement

June 2014

Title: "Improving the Quality of Pavement Profiler Measurement" Pooled Fund Project  
TPF-5(063)"

Task Number: 0570

Start Date: November 15, 2003

Completion Date: September 6, 2014

Product Category: New Technical Standard, Plan, or Specification

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### TITLE:

"Improving the Quality of Pavement Profiler Measurement" Pooled Fund Project  
TPF-5(063)"

Study established to provide direction and funding that will unify the strategies, address implementation efforts, and promote practices to improve accuracy and repeatability of the equipment and promote the knowledge and understanding of profile equipment and measurements.

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### WHAT IS THE NEED?

Pavement smoothness has been recognized as one of the key measures of pavement performance. Studies have confirmed that highway users judge the condition of the highway system primarily by the ride that they experience when traveling over the roadway. This pooled fund effort will provide agencies with information and first hand experience to address issues and concerns related to profiler operation, equipment, and procedures.

There is an increased need for State Highway Agencies to purchase and upgrade profiling equipment to provide network level and project specific smoothness information. This includes profilers operated at close to posted speed limits that are most often used to determine ride quality on a network level and smaller units, such as lightweight profilers.

### WHAT ARE WE DOING?

The following is a list of approved priorities:

- 1- Development of a Reference Profile Device
  - a. Benchmark testing.
  - b. Reference device.
- 2- Critical Profile Accuracy Requirements.
- 3- Construction Acceptance and Correction Software.

- 4- Regional Validation Sites.
- 5- Evaluating Upper Limits of Single Accelerometer and Single Height Sensor.
- 6- Emerging Technology that Enhances Profile Measurement.
  - a. Automated Faulting Measurement.
  - b. Low Speed and Urban International Roughness Index (IRI) Measurement.
  - c. Ride quality index at different speeds.
- 7- Support for Road Profiler User's Group.

Contract awards have been approved on each of the priorities and work is being performed.

## **WHAT IS OUR GOAL?**

The goal of the "Improving the Quality of Pavement Profiler Measurement" Pooled-Fund Study is to assemble states and the Federal Highway Administration (FHWA) to

- (1) identify data integrity and quality issues with inertial profilers;
- (2) suggest approaches to addressing identified problems;
- (3) initiate and monitor projects intended to address identified problems;
- (4) disseminate results; and
- (5) assist in solution deployment.

## **WHAT IS THE BENEFIT?**

- a) Provide a pavement profiler reference device that assists Agencies with profiler certification and validation that all inertial profilers are collecting correct pavement profiles that can be used for ride quality indices.
- b) Provide assistance with regional calibration/validation centers that would provide uniform quality data collection by inertial profilers.
- c) Providing a standardized engineering tool that removes the "black box" concept of understanding pavement profiles collected by inertial profilers.
- d) Provide technical guidance on validity of using inertial profilers when using a single axis accelerometer.

## **WHAT IS THE PROGRESS TO DATE?**

The following is being done:

Priority 1: Evaluations have been completed and report cards are available.

Priority 2: Critical Profile Accuracy Requirements report posted at

<http://www.pooledfund.org/Details/Study/280>

Priority 3: ProVAL software and support that includes grinding simulation is being posted at [www.roadprofile.com](http://www.roadprofile.com). New version 3.4 was released November 15, 2012.

Priority 4: This study was awarded to SME, Inc. and was kicked off in October.

Priority 5: First phase of understanding the limitations of a single accelerometer completed. Second phase final report has been completed and is awaiting a tech brief.

Priority 6: Automated Faulting Module was completed by December 15, 2010 and included in ProVAL software.

Priority Six B & C: NCHRP Study 10-93 has been funded. A contractor was selected and the contract has been signed.

An award has been made to UMTRI for a study on how to measure ride at low speeds and in urban areas.

Reports completed:

- 1- "Critical Profiler Accuracy Requirements" August, 2005
  - 2- "Accuracy Limitation of Road Profilers Based on a Single-Axis Accelerometer", January, 2007
  - 3- "Benchmark Test Evaluation Report" September, 2011
  - 4- "Evaluation of Potential Pavement Profile Reference Devices", January, 2013
  - 5- "Benchmark Profiler Field Manual" July, 2013
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